

## **REMARKS**

With this Response, claims 1, 16, and 35 are amended. Claim 41 is added herein.

Therefore, claims 1-41 are pending.

## **Oath/Declaration**

Applicants understand that a new declaration is required. A declaration will be filed with the signature of the second inventor.

## **Drawing Changes**

Please find filed herewith an amended drawing sheet for Figure 7. Specifically amended in the replacement drawing is the topmost block, which is changed from "From 506" to "From 606" to reflect the description in the Specification.

## **Claim Rejections - 35 U.S.C. § 103**

### **Claims 1-2, 4, 16-19, and 21-22**

Claims 1-2, 4, 16-19, and 21-22 were rejected under 35 U.S.C. § 103(a) as being unpatentable over publication "Increasing Data Rate Over Wireless Channels," May 2000, IEEE Signal Processing Magazine, Volume: 17, Issue: 3, pages 76-92, of Naguib et al. (*Naguib*) in view of U.S. Patent Application Publication No. US 2002/0114288 A1 of Soliman (*Soliman*). Claims 4 and 21 are canceled herein; therefore, rejection of these claims is moot. Applicants respectfully submit that the remaining claims are not rendered obvious by the cited references for at least the following reasons.

Claim 1 as amended recites in part the following:

detecting a weak link component in the wireless communication link;  
**introducing multidimensional diversity**, producing diversity in two or more of the space, time, and/or frequency domains, **into at least the weak link**

**component in response to detecting the weak link to generate a plurality of decorrelated signals associated with the weak link component; and**  
**selectively combining received ones of the plurality of decorrelated signals which, when demodulated, provides a representation of content originally transmitted in the received signal(s).**

Claim 16 recites similar limitations directed to a multidimensional diversity agent to produce multidimensional diversity into an identified weak link component.

At page 2, the Office Action asserts that *Naguib's* discussion of diversity techniques, including space-time coding, discloses introducing multidimensional diversity at pages 77, 85-86, and 89. Applicants note that the coding techniques of *Naguib*, including space-time coding, assume a system with a fixed type of diversity. See pages 77, and 82-86. Thus, the system's contemplated use, for example, is only for space diversity of the differing positions of antennas "to introduce temporal and spatial correlation into signals." See page 77. The temporal correlation is added by the spatial diversity of *Naguib* by the fact that signals will arrive at different times because of the spatial diversity of the antennas, and the spatial correlation is added by having, for example, different direction of arrival components because of the spatial diversity. Thus, Applicants further contend that the mere fact that a signal has different types of correlation does not necessarily suggest that a system uses different types of diversity. Whether or not *Naguib* discloses or suggests a system with more than one type of diversity, which Applicants do not concede, no disclosure or suggestion is made in *Naguib* to introduce multidimensional diversity in a weak link component in response to detecting the weak link component, as recited in the claim 1, or to introduce multidimensional diversity in an identified weak link component.

The Office Action cites *Soliman* as disclosing detecting a weak link. Whether or not *Soliman* discloses detecting a weak link, *Soliman* fails to disclose or suggest introducing

multidimensional diversity in a weak link component in response to detecting the weak link component, and so fails to cure the deficiencies of *Naguib*.

Because the cited references, whether alone or in combination, fail to set forth at least the element of the claims set forth above, Applicants respectfully submit that the references fail to render obvious the invention as recited in the claims. Claim 2 depends from claim 1, and claims 17-19 and 22 depend from claim 16. Because dependent claims necessarily include the limitations of the claims from which they depend, Applicant submits that these claims are not rendered obvious by the cited references for at least the reasons set forth above.

Claims 3 and 20, 5-10, 11 and 13, 12 and 14, 15, 23  
24-25, 26, 27-29 and 31-33, 30, and 34

Claims 3 and 20, 5-10, 11 and 13, 12 and 14, 15, 23, 24-25, 26, 27-29 and 31-33, 30, and 34 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Naguib* and *Soliman*, and further in view of various other cited references: specifically, claims 3 and 20 in view of U.S. Patent No. 6,591,382 B1 issued to Molloy et al. (*Molloy*) and U.S. Patent No. 5,722,051 issued to Agrawal et al. (*Agrawal*); claims 5-10 in view of U.S. Patent No. 6,052,594 issued to Chuang et al. (*Chuang*) and U.S. Patent No. 6,170,075 B1 issued to Schuster et al. (*Schuster*); claims 11 and 13 in view of *Chuang*, *Schuster*, and U.S. Patent No. 5,881,105 issued to Balachandran et al. (*Balachandran*); claims 12 and 14 in view of *Chuang*, *Schuster*, *Balachandran*, and U.S. Patent No. 6,694,155 B1 issued to Chin et al. (*Chin*); claim 15 in view of U.S. Patent No. 6,044,349 issued to Tolopka et al. (*Tolopka*); claim 23 in view of Chin; claims 24-25 in view of *Balachandran*; claim 26 in view of *Balachandran* and *Schuster*; claims 27-29 and 31-33 in view of *Balachandran*, *Schuster*, and *Chuang*; claim 30 in view of *Balachandran*, *Schuster*, *Chuang*, and *Chin*; and claim 34 in view of U.S. Patent No. 5,819,174 issued to Kyllonen (*Kyllonen*).

Applicants note that the examination of the claimed invention and the application of these

numerous references is a significant task; Applicants thank the Examiner for the thorough examination and the thorough analysis of the references.

Applicants respectfully submit that these claims are not rendered obvious by the cited references for at least the following reasons. Each of the rejections made above is based on the application of *Naguid* and *Soliman*, shown above to be defective with respect to the independent claims 1 and 16, from which each of the above-listed dependent claims depends. The cited references do not cure the deficiencies of *Naguid* and *Soliman* noted above with respect to the independent claims. Applicants respectfully submit that a prima facie case of obviousness under MPEP § 2143 has not been established with respect to independent claims 1 and 16, at least for failing to establish that the cited references disclose every element of the claimed invention, specifically, introducing multidimensional diversity in a weak link component of a wireless communication. Because the independent claims are nonobvious, the dependent claims are also nonobvious. See MPEP § 2143.03.

#### Claims 35-36

Claims 35-36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Naguib* and *Soliman* in view of *Tolopka*. Applicants respectfully submit that these claims are not rendered obvious by the cited references for at least the following reasons.

Claim 35 as amended herein recites in pertinent part the following:

A machine accessible storage device comprising a plurality of executable instructions which, when executed by an accessing machine, implement a multidimensional diversity agent to **selectively introduce multidimensional diversity, to produce diversity in two or more of the space, time, and/or frequency domains, into at least an identified weak link component** of a wireless communication link ...

Applicants note the claim elements of a diversity agent to introduce multidimensional diversity into an identified weak link component of a wireless communication link, similar to that

discussed above with respect to claims 1 and 16. Thus, Applicants respectfully submit that Applicants' arguments above with respect to the application of *Naguid* and *Soliman* to claims 1 and 16 apply equally well with respect to the application of these references to claim 35.

*Tolopka* is cited as disclosing a machine readable storage medium, and is not cited as curing the deficiencies noted above with respect to *Naguid* and *Soliman*. Therefore, whether or not *Tolopka* discloses what is asserted in the Office Action, Applicants respectfully submit that a prima facie case of obviousness under MPEP § 2143 has not been established, at least because the cited references, whether alone or in combination, fail to disclose the element of introducing multidimensional diversity in an identified weak link component, as recited in claim 35.

Claim 36 depends from claim 35, and so necessarily includes the limitations of claim 35. Because claim 35 has been shown to be nonobvious, Applicants respectfully submit that claim 36 must necessarily also be nonobvious over the references. See MPEP § 2143.03.

#### Claims 37-40

Claims 37-40 were rejected under 35 U.S.C. § 103(a) as being unpatentable over *Naguib*, *Soliman*, and *Tolopka* in view of various references; specifically, claim 37 in view of *Molloy* and *Agrawal*; claims 38-39 in view of *Schuster*, and claim 40 in view of *Balachandran*. Applicants respectfully submit that these claims are not rendered obvious by the cited references for at least the following reasons.

Each of these claims depends from claim 35. Each rejection of these claims is based on an improper rejection of the independent claim 35 under *Naguib*, *Soliman*, and *Tolopka*, as established above. Because dependent claims necessarily include the limitations of the claims from which they depend, Applicants respectfully submit that claims 36-40 are not rendered obvious by the cited references for at least the reasons set forth above for claim 35.

#### New Claim 41

New Claim 41 is presented herein for examination. Claim 41 recites the following:


determining that an effective signal strength of a signal on a wireless communication link using a dimension of signal diversity is insufficient to provide a desired communication range;  
**introducing an additional dimension of signal diversity into the determined wireless communication link** to generate multiple decorrelated signals corresponding to signal on the wireless communication link; and  
selectively combining the decorrelated signals and demodulating combined, decorrelated signals to generate a representation of the content of the signal.

Applicants respectfully submit that the cited references fail to disclose or suggest introducing an additional dimension of signal diversity into a wireless communication link. In contrast, the cited references, where diversity is used, assume a static use of signal diversity. Thus, Applicants submit that a rejection of claim 41 under the cited references would be improper, because the cited references fail to disclose every element of the claim.

#### Conclusion

For at least the foregoing reasons, Applicants submit that the rejections have been overcome. Therefore, all pending claims are in condition for allowance and such action is earnestly solicited. The Examiner is respectfully requested to contact the undersigned by telephone if such contact would further the examination of the present application.

02-2666.

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11 June 2004  
Date of Deposit

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